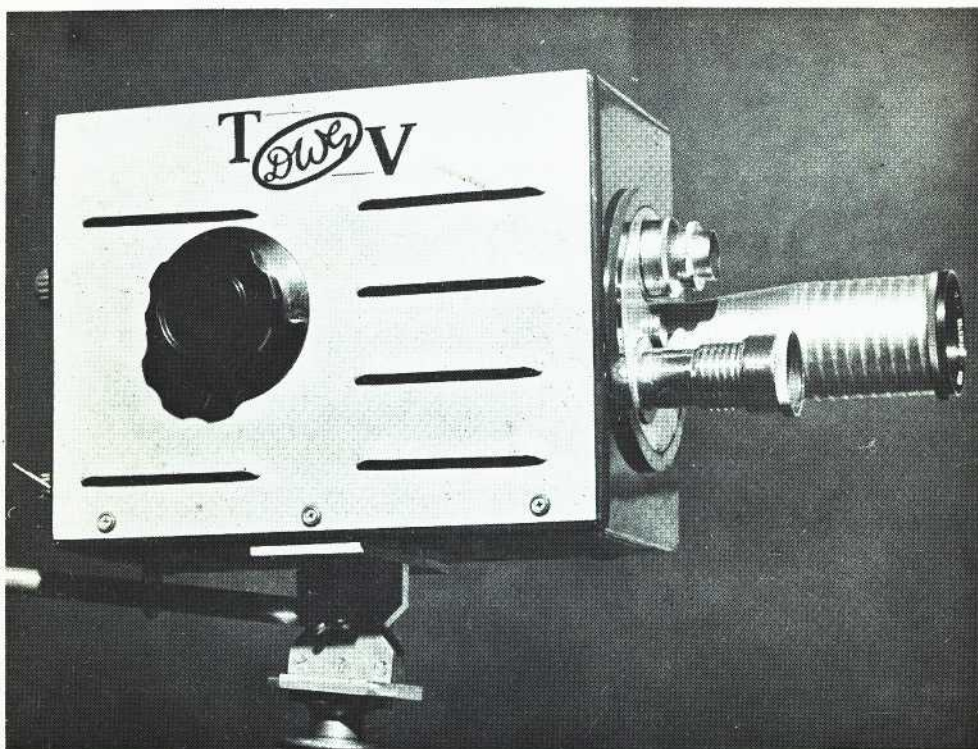


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CQ-TV - Journal of the British Amateur Television Club.

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#### SIXTH AMATEUR TELEVISION CONVENTION

As already announced, this event will take place on Saturday, 8th September in the Conway Hall, Red Lion Square, Holborn, London, W.C.1, from 10 a.m. to 7 p.m.

It is hoped that a really representative selection of amateur TV gear will be shown in working action ; all members who wish to exhibit are asked to write to the Hon.Sec. as soon as possible, stating what equipment they can bring, the table area (or floor space) and the mains power required. 240 V.A.C. 5 amp sockets will be the standard outlet. If you will need sync pulses, please mention it.

The General Meeting will be held in the Large Hall at 2.30 p.m. One item on the Agenda will be the approval of the provisional Constitution adopted at the previous meeting (copies of which were sent to all members with CQ-TV 46). Would members who wish to bring up any other business for discussion please inform the Hon. Sec. as soon as possible. During the Meeting, non-members will be entertained in the Small Hall. Refreshments will be available during the day.

Admission prices will be the same as in 1960 : members, 3/6d all day, or 2/- after 2 p.m. ; non-members, 5/- all day, or 2/6d after 2 p.m. Tickets are available from the Hon.Sec.

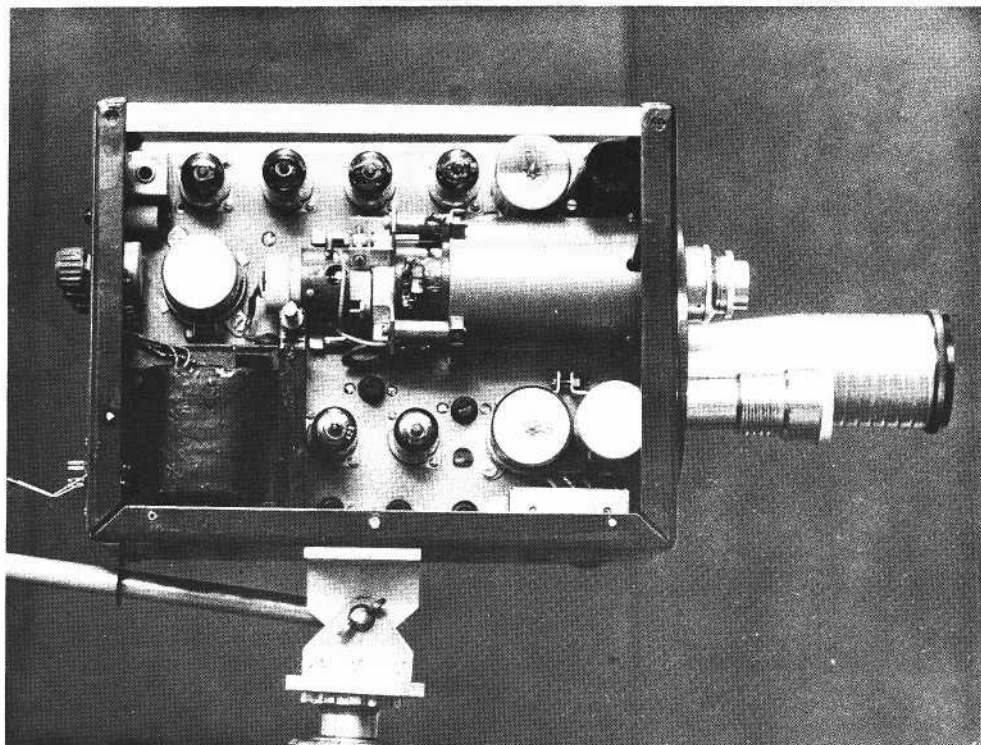
This edition of CQ-TV carries two major articles - one on a complete, self contained Vidicon camera; ideal for the beginner or for the amateur needing a small camera channel without external pulse and control equipment. The other article is about a complete pulse generator - the first time we have been able to describe a complete unit in one edition. Max Brown has developed the circuit, and although he has put a large amount of original thought into the design he asks that the use of circuits from several commercial equipments should be acknowledged.

Because of the space taken up by these two articles this edition's 'What the Other Chap is Doing' feature has been held over to the next edition, as has the new members lists and address changes.

VIDICON NEWS A limited number of Vidicon tubes are occasionally available to members of the Club at £5 each. If you are interested in these tubes please contact John Tanner. The tubes are rejected Staticon/Vidicon tubes with minor blemishes or excessive lag.

SCANNING YOKES Scan & Focus coils are now being made specially for B.A.T.C. Focus coil either for Valve use or Transistor use, as specified at time of ordering. Price (provisional) £5 per set of coils, supplied complete with target screen and connector. Orders to D.S.Reid please. More details available on request.

# A SEVEN VALVE CAMERA



This extremely simple camera has been developed by D. Goodyear of St Albans, and is a completely self-contained unit. It is a random interlace unit with self running line oscillator and field driven by the supply mains. No extra pulse equipment is required and the output is positive modulated R.F. in Band 1 ready for display on any domestic television receiver. Although this camera is designed for the 405 line, positive mod system relatively simple modifications will enable the camera to run on 525 or 625 lines, with negative modulated R.F. if required.

## Circuit.

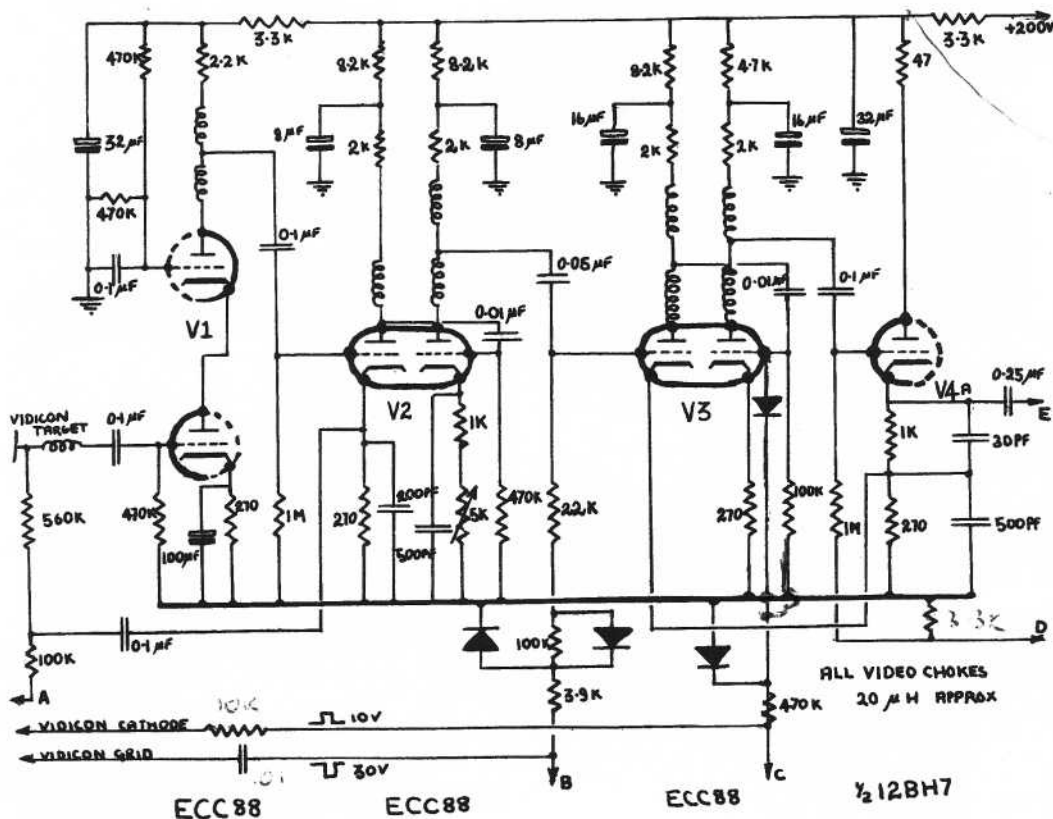
Line Scanning is achieved by a free running multivibrator, precise frequency controlled by the 470K pot in the grid circuit of V6a. The output of the oscillator is coupled to the second half of V7 which is an output tetrode. Line amplitude controlled by a 500 ohm pot in the cathode. Control of line scanning linearity is by a 1K variable in a damping circuit across the scan coils. Camera tube flyback blanking and line sync pulses are taken from the secondary of the line scan transformer.

Field scanning is derived from the mains. 50c/s is taken from the mains transformer and after being clipped and shaped is fed to the grid of a triode, V6b used as a discharge switch for the sawtooth generating circuit in its anode circuit. V4b, half a 12BH7, is the field scan output valve used as a cathode follower feeding the scan coils direct. Feedback is taken from the cathode to the sawtooth generator to linearise the scan. Control of scan amplitude and linearity is obtained by the 2 Meg and 2.5K pots associated with the output circuit. To balance the standing potential on the cathode of the cathode follower the scan coils are returned to an adjustable voltage - this acts as a field shift control. Camera tube flyback blanking and field sync pulses are taken from the cathode of the discharge valve.

Video amplification starts with an ECC88 cascode amplifier, followed by a second ECC88 - feedback for the first stage is taken from the cathode of the second valve. The following stage has controlled feedback in the cathode for H.F. correction. A third ECC88 follows with line sync pulses mixed in

Power for the unit comes from a 150 volt transformer H.T. for the circuitry coming from a voltage doubler, and 300 volts for the Vidicon G2 from a tripler, with the doubler incorporated. A further circuit provides -120 V for the Vidicon beam control and for the Video amp.

No problems should be experienced setting the camera up once it has been built - check with a pair of headphones that both scans are present (if no 'scope is available) and check that the monitoring receiver locks to the camera, check the voltages on the tube socket, check that R.F. patterning can be seen if a finger is placed near the target connector in the scanning assembly. After these checks plug the tube in, set both scan controls for maximum scan, and then when the target can be seen reduce both scans until the corners of the target cannot be seen. Target volts control will act as a gain control, and a little experimenting with the various controls will soon reveal the best operating conditions. Vidicon tubes are quite robust, but when testing the camera keep the target volts as low as possible, and at all times avoid pointing the camera at intensely hot, bright objects. Also, remember that inverting a camera tube of any type can permanently damage the tube due to small particles falling on the photosensitive layer or blocking the very fine copper meshes used in these tubes.









CQ-TV

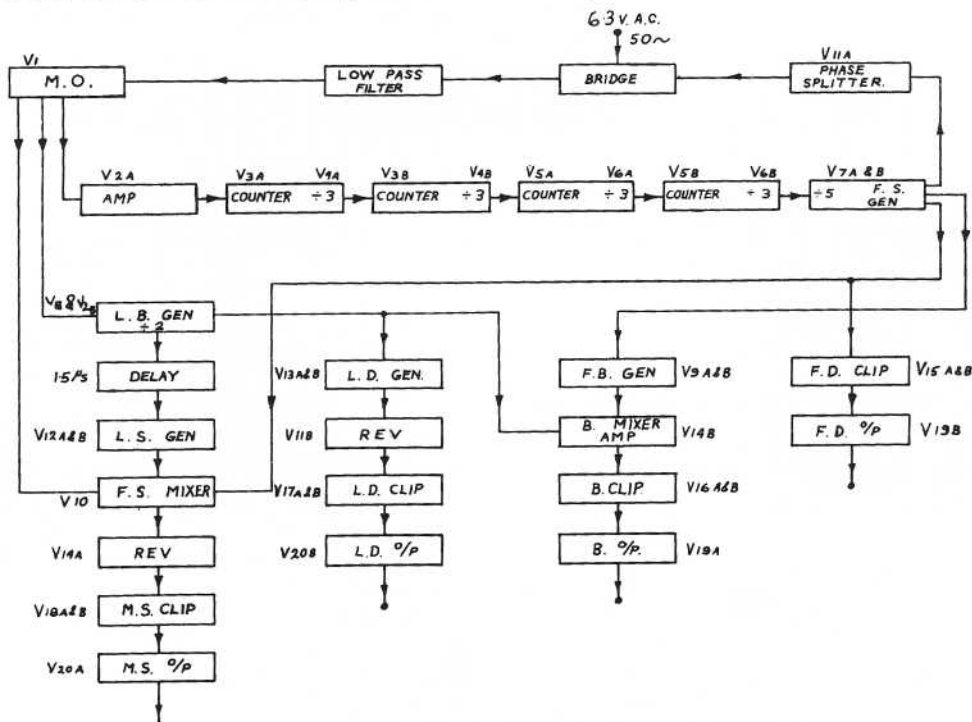
# A COMPLETE INTERLACED PULSE GENERATOR

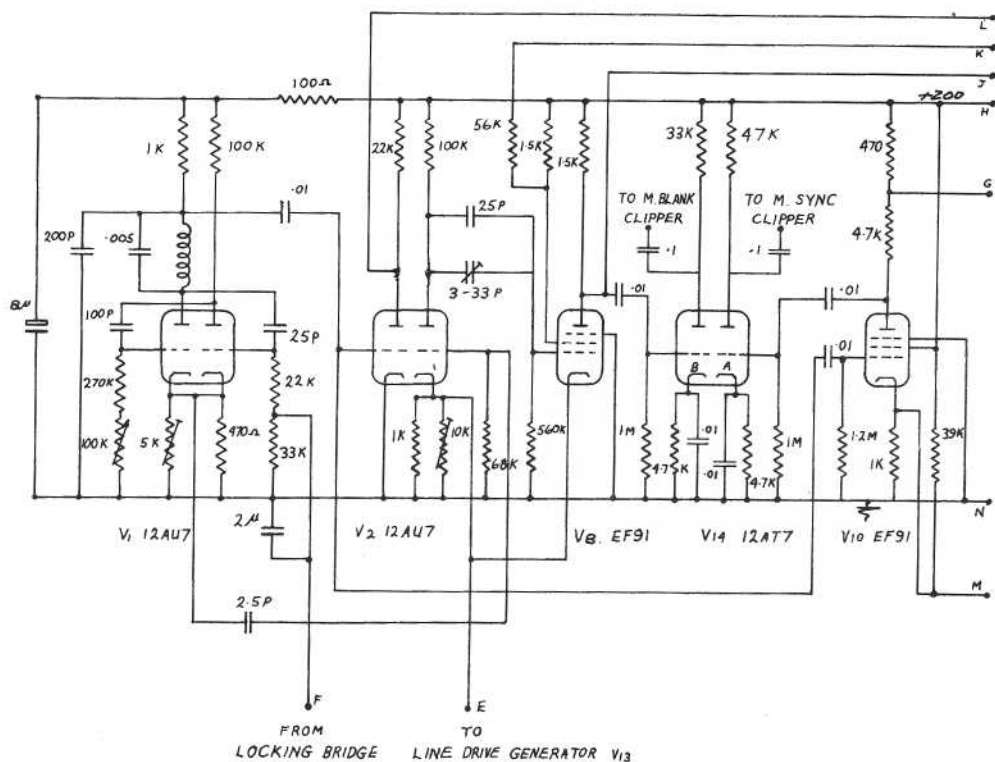
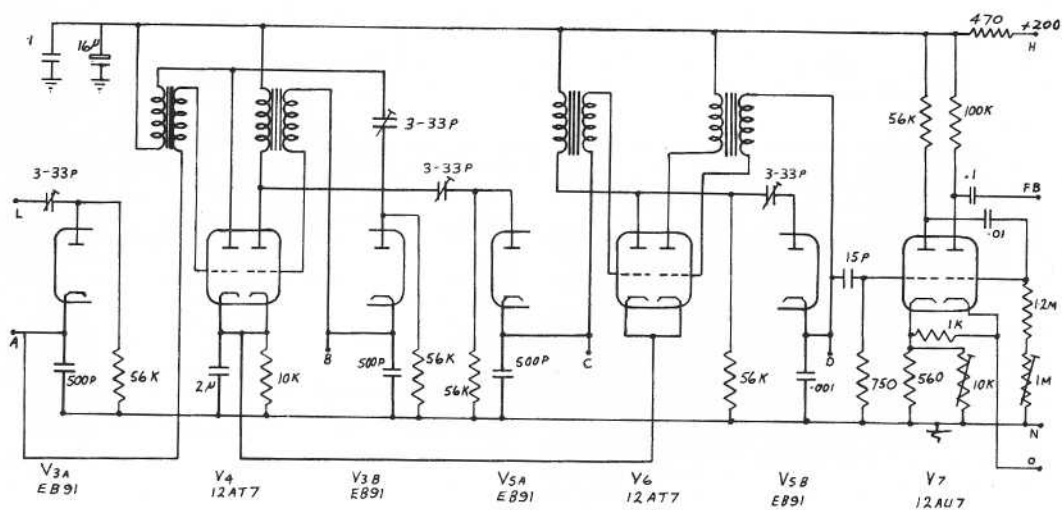
By M.B. Brown, G3KUJ

This sync pulse generator has been designed to produce the standard waveform used by the British 405 line system. The version shown uses a blocking oscillator type counter in the divider chain, but this is not essential, and one version of the unit has given satisfactory service for over a year using the counter chain described by Mike Barlow in CQ-TV number 41, with minor modifications mentioned later.

The whole unit consists of a master oscillator on twice line frequency, the output from this is fed into a divider - a 405 divider shown here although a 525 or 625 divider has been used with good results - the output from the divider compared with a reference, usually the local supply mains, and an A.F.C. loop tied into the M.O. Two other outputs from the M.O. are fed into the pulse forming circuits - one to the field sync mixer, the pulses from the M.O. being the correct polarity and width for use straight into the mixer - the other output to the Line Blanking generator which is set to run at line frequency and acts

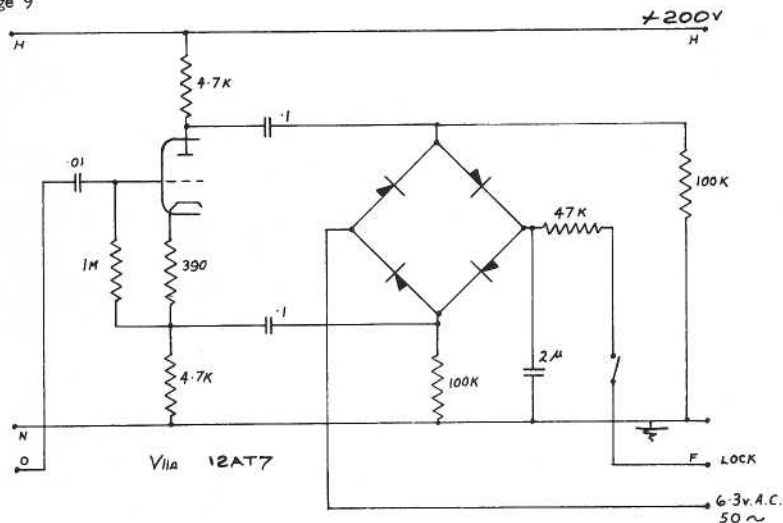
as the divide by two circuit for the remainder of the line frequency circuits. Line Drives are timed to start coincident with the leading edge of Line Blank, and line sync starts  $1\frac{1}{2}$   $\mu$ s later, the delay achieved by R.C., the 56K and 200 pF coupling between the L. Blank gen and the L. Sync. gen. This deals with the Line frequency section. Field frequency circuits are driven from the output of the counter chain, and the final divider is arranged to produce a pulse four lines wide for use as a field drive pulse, and to operate the gate for mixing the twice line frequency pulses during the field sync period. All the output waveforms are clipped by multivibrator type clippers, and the four outputs set to 2 volts negative going in 75 ohms by the adjustable resistor in the output valve cathode. Two 12BH7 double triodes cope with all four pulse outputs.





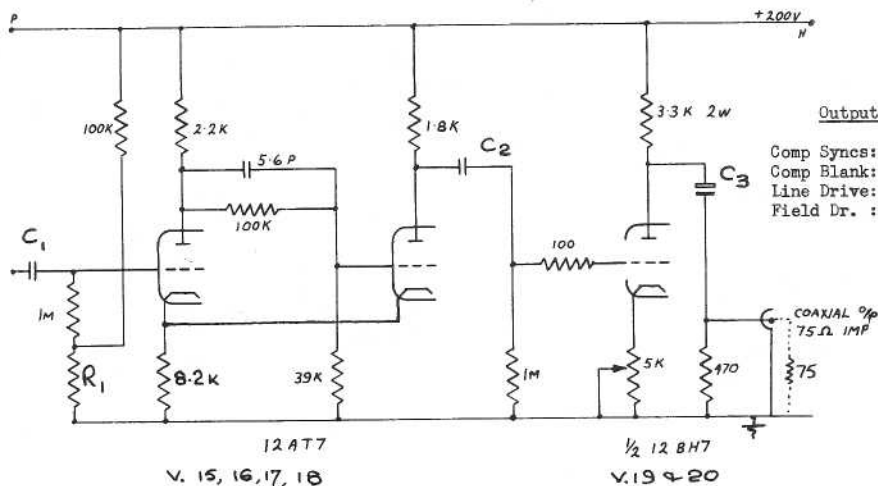






Power Supply for the generator used on the prototype was 200 volts from a series regulator, but a silicon diode rectifier type supply should be sufficiently low impedance to operate the generator without any additional regulator. However, some decoupling may be necessary on the H.T. line. Note that the version of this generator built by G3NDT/T uses Mike Barlow's counter chain with the germanium diodes replaced by valve diodes - the final counter followed by a triode phase splitter to feed the locking bridge, and a

separate field drive generator instead of the last counter as shown here. Most of the modifications to the Barlow counter are due to Deryck Aldridge. Diodes for the locking bridge - almost any cheap diodes can be used here. Small copper oxide units were used by G3KUJ, G3NDT/T uses valve diodes. The 'Genlock' system used by Mike Barlow is extended in the unit built by G3NDT/T to include facilities for 'Colour Lock' - locking to the output of a divider from the colour subcarrier to line frequency, although this has not been tried yet.



## MEMBERS' ADVERTISEMENTS

**For Sale** 931A & video amplifier, with 5FP7.

Price 60/-; apply to: V. Cedar,  
2A Convent Hill, Upper Norwood, London, S.E.19.

**For Sale** A lot of gear including valves, tubes, a couple of 931As, 5FP7 and components. Apply: T. Luxford, G3MUB/T, 90 Endlebury Road, Chingford, London, E.4.

**For Sale** Booklet "18 & 38 Set Owners Mains Power Unit". Price 5/- per copy, from D. Bloxham, 14 Highland Road, Southsea, Portsmouth.

**Exchange** John Black, W3DDK, Box 269 Route 1, Arnold, Maryland, U.S.A. says he is a great swapper; to any members who are similarly interested, he will be happy to send a list of the items he has, which include radio & TV gear, valves, still and movie cameras, etc.

**Loan** Can anyone assist R. Monteil F8UM with the loan of RSGB Bulletins March, April and May 1953, and June 1955? These may be sent via the Hon. Sec. F8UM promises to return them within three or four days.

Notes on the Construction of the Mike Barlow Pulse Timer Unit, from Beryck Aldridge.

**Timer Unit.** If space (and extra heater current) is available use thermionic diodes in place of OA86. EA50 or EB91 give much better step counter waveforms.

For the adjustment of V3 use a 50K variable resistor in series with about 33K as in V4. This gives a much greater range of control and enables the unit to be set to 525 or 625 as well as 405, although the trimmer method is adequate for V2. However, variable R. control for all counters does enable the unit to be set up without going inside!

V5 - the fact that the 6.3 volts supply is connected into the discriminator circuits attached to this valve causes jumping of the step counter waveform when the unit is warming up and hence difficulty in obtaining true lock. This can be avoided by using a buffer stage between the two sections. Half a 12AT7 with anode and cathode loads of 10K works well.

Difficulty was experienced in obtaining satisfactory operation of the A.F.C. circuit. This was much improved by reducing the 6.3 volts input to about 2 volts using a simple divider. This, incidentally, reduced the amount of smoothing needed to the control amplifier. It was, however still necessary to increase this from .5/330K to .5/3Meg.

For the Beginner:

## SOME THOUGHTS ON COUPLING CAPACITORS

Have you ever wondered what value of coupling capacitor you should use, or of what type? Have a look at Figure 1, which shows a typical interstage coupling. If  $R_1$  is large compared to  $R_2$  then the time constant of the coupling is  $= 1/C(R_1 + R_2)$ . If either  $R_1$  or  $R_2$  is large, then C can be small. Aim at a t.c. of at least 0.1mfd and 1M, eg 1mfd and 0.1M, 10mfd and 10K etc.

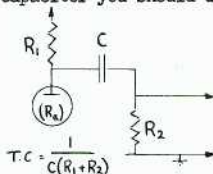


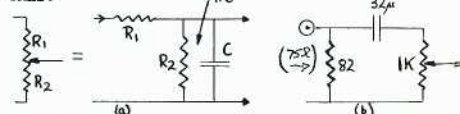
FIG. 1

In the usual case where  $R_1$  is only a few K and  $R_2$  is a grid leak of say 1M, then the resistance of the capacitor must be much greater than 1M or the signal will be potted down by the network of  $R_1$  and  $R_2$ . So use a good paper capacitor here - but don't mount it so close to the chassis that its bulk introduces appreciable stray capacity to ground.

Where both  $R_1$  and  $R_2$  are small, you must use an electrolytic capacitor. If  $R_2$  is say 75 ohms and  $R_1$  a few K, then use at least 32mfd, preferably more. Since  $R_2$  is so low, some leakage won't matter too much, nor will the bulk stray capacity have much effect, so a standard electrolytic is in order here. If the leakage is important, use a low leakage Superlytic type.

Figure 2 shows the usual input circuit to a TV unit. Here if  $R_2$  is small leakage doesn't matter and an electrolytic or low volt paper capacitor can be used. Make sure that the tube does not take grid current though, or  $R_2$  will be shunted by about 1K. If  $R_2$  is larger, we can use a smaller C anyway, and we are back to paper or superlytics. With the input at 75 ohms, stray capacity will have little effect.

One complication arises sometimes when an input attenuator is required. Since the tube grid has an appreciable capacity, the attenuator looks like this:



Thus the response worsens as the pot is turned down. The effect is reduced by keeping  $R_1 + R_2$  as small as possible, and then using a large C to maintain the correct time constant, as shown in (b). -M.B

